<u>WHAT IS CLAIMED AS NEW AND IS DESIRED TO BE SECURED BY LETTERS PATENT OF THE UNITED STATES IS:</u>

1. In a driving method for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving method being characterized by comprising a first stage of applying a voltage so that the alignment of the cholesteric liquid crystal is in substantially parallel to a voltage application direction; a second stage of applying a voltage to change the state of the cholesteric liquid crystal to a homogeneous state or a homogeneous/planar-mixed state, and a third stage of applying a voltage to change the state of the cholesteric liquid crystal from the homogeneous state or the homogeneous/planar-mixed state to a focalconic state.

2. In a driving method for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving method being characterized by comprising a first stage of applying a voltage so that the alignment of the cholesteric liquid crystal is in substantially parallel to a voltage application direction; a second stage of applying a voltage to change the state of the cholesteric liquid crystal to a homogeneous state or a homogeneous/planar-mixed state, and a third stage of applying a voltage to change the state of the cholesteric liquid crystal from the homogeneous state or the homogeneous/planar-mixed state

state to a focalconic/planar-mixed state.

3. The driving method according to Claim 1, wherein $0.8\times\tau_H \leqq \tau_2 \leqq 8\times\tau_H$ is satisfied where τ_2 is a period of the second stage and τ_H is a time spent until the cholesteric liquid crystal in a homeotropic state by the application of a voltage indicates the lowest dielectric constant after the application of the voltage is stopped.

4. The driving method according to Claim 3, wherein $\tau_H \leqq \tau_2 \leqq 5\times\tau_H$ is satisfied.

5. The driving method according to Claim 1, wherein the voltage value applied in the second stage is 0 V.

6. The driving method according to Claim 1, wherein a voltage waveform applied in the first stage is constituted by a pulse-like voltage having a voltage amplitude of V_1; a voltage waveform applied in the third stage is constituted by a pulse-like voltage having a voltage amplitude of V_3, and V_1 is larger than V_3 and τ_3 is smaller than τ_1 where τ_1 and τ_3 are respectively voltage application times in these stages.

7. The driving method according to Claim 1, wherein when a a-line-at-a-time operation is carried out to apply a voltage waveform based on display data of each display pixel after the first stage to the third stage, and conditions of applying voltages are determined so as to write a planar state in an ON display and to write a focalconic state in an OFF state, a pulse width modulation system is used for a display having a gray

scale.

8. In a driving apparatus for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving apparatus being characterized by comprising a first period determining means for determining a period of a first stage; a second period determining means for determining a second period in succession to the first stage; a third period determining means for determining a third period in succession to the second stage, and a voltage application means wherein a voltage is applied to the cholesteric liquid crystal so that its alignment is in substantially parallel to a voltage application direction in the first period produced by the first period determining means; a voltage is applied to the cholesteric liquid crystal to change the state of the liquid crystal to a homogeneous state or a homogenous/planar-mixed state in the second period produced by the second period determining means, and a voltage is applied to the cholesteric liquid crystal to change the state from the homogeneous state or the homogenous/planar-mixed state to a focalconic state or a planar/focalconic-mixed state in the third period produced by the third period determining means.

9. In a driving method for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving method being characterized by comprising a first stage of applying a

voltage so that the alignment of the cholesteric liquid crystal is in substantially parallel to a voltage application direction before a voltage is applied to each pixel based on conditions of voltage corresponding to display data; a second stage of applying a voltage to change the state of the cholesteric liquid crystal to a homogeneous state or a homogeneous/planar-mixed state, and a third stage of applying a voltage to accelerate the change of the cholesteric liquid crystal from the homogeneous state or the homogeneous/planar-mixed state to a focalconic state or a focalconic/planar-mixed state, wherein the second stage and the third stage are repeated after the first stage.

10. The driving method according to Claim 9, wherein the voltage value applied in the second stage is 0 V.

11. The driving method according to Claim 10, wherein the number of times of repeating the second stage and third stage is 2 to 10.

12. The driving method according to Claim 9, wherein a voltage waveform applied in the first stage is constituted by a pulse-like voltage having a voltage amplitude of V_1; a voltage waveform applied in the third stage is constituted by a pulse-like voltage having a voltage amplitude of V_3, and V_1 is larger than V_3 and τ_3 is smaller than τ_1 where τ_1 and τ_3 are respectively voltage application times in these stages.

13. The driving method for a display device with a

cholesteric liquid crystal according to any one of Claims 1 to 11, wherein a voltage waveform applied in the first stage is constituted by a pulse-like voltage having a voltage amplitude of V_1; a voltage waveform applied in the third stage is constituted by a pulse-like voltage having a voltage amplitude of V_3, and V_1 is equal to V_3 and τ_3 is smaller than τ_1 where τ_1 and τ_3 are respectively voltage application times in these stages.

14. The driving method according to Claim 9, wherein when a a-line-at-a-time operation is carried out to apply a voltage waveform based on display data of each display pixel after the completion of the first stage to the third stage, and conditions of applying voltages are determined so as to write a planar state in an ON display and to write a focalconic state in an OFF state, a pulse width modulation system is used for a display having a gray scale.

15. In a driving apparatus for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving apparatus being characterized by comprising a first period determining means for determining a period of a first stage; a second period determining means for determining a second period in succession to the first stage; a third period determining means for determining a third period in succession to the second stage; a voltage application means wherein a voltage is applied to the cholesteric

liquid crystal so that its alignment is in substantially parallel to a voltage application direction in the first period produced by the first period determining means; a voltage is applied to the cholesteric liquid crystal to change the state of the liquid crystal to a homogeneous state or a homogenous/planar-mixed state in the second period produced by the second period determining means, and a voltage is applied to the cholesteric liquid crystal to accelerate a change of the state from the homogeneous state or the homogenous/planar-mixed state to a focalconic state or an intermediate state between planar and focalconic states in the third period produced by the third period determining means, and a frequency controlling means for operating repeatedly the second period determining means and the third period determining means after the operation of the first period determining means.

16. In a driving method for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving method being characterized in that a display state is initialized by applying a predetermined voltage to each pixel and a voltage is applied to each pixel based on conditions of voltage corresponding to display data, wherein when the temperature of the cholesteric liquid crystal is lower than a predetermined temperature, a voltage application time is extended from the voltage application time

corresponding to the predetermined temperature, and when the temperature of the cholesteric liquid crystal is higher than the predetermined temperature, a voltage application time is shortened from the voltage application time corresponding to the predetermined temperature.

17. The driving method according to Claim 16, wherein in driving according to a passive addressing system, when a period for initializing is represented by T_1 and a period for applying a voltage to each pixel based on conditions of voltage corresponding to display date is represented by T_2, lengths of T_1 and T_2 are extended from the lengths of T_1 and T_2 determined with respect to the predetermined temperature when the temperature of the cholesteric liquid crystal is lower than the predetermined temperature.

18. The driving method according to Claim 17, wherein the period T_1 for initializing includes a first stage of applying a voltage so that the alignment of the cholesteric liquid crystal is in substantially parallel to a voltage application direction; a second stage of applying a voltage to change the state of the cholesteric liquid crystal to a homogeneous state or a homogeneous/planar-mixed state, and a third stage of applying a voltage to change the state of the cholesteric liquid crystal from the homogeneous state or the homogeneous/planar-mixed state to a focalconic state or a

focalconic/planar-mixed state, wherein when periods of the first stage, the second stage and the third stage are respectively represented by T_{10}, T_{11} and T_{12}, and when the temperature of the cholesteric liquid crystal is lower than a predetermined temperature, the lengths of T_{10}, T_{11} and T_{12} are extended from the lengths of T_{10}, T_{11} and T_{12} determined with respect to the predetermined temperature.

19. The driving method according to Claim 18, wherein when T_{10}, T_{11}, T_{12} and T_2 at a predetermined temperature are represented by T_{10r}, T_{11r}, T_{12r} and T_{2r}, and when the temperature of CL-LC is lower than the predetermined temperature, T_{10}, T_{11}, T_{12} and T_2 are made respectively to be $n_1 \times T_{10r}$, $n_2 \times T_{11r}$, $n_1 \times T_{12r}$ and $m \times T_{2r}$ where $n_2 \geqq n_1$ and $n_2 \geqq m$.

20. The driving method according to Claim 16, wherein when the predetermined temperature is 25°C, a period for applying a voltage to each pixel based on conditions of voltage corresponding to display data at an optional temperature t_p is $T_2(t_p)$ and K_A is a constant relying on 5 to 50 liquid crystal materials, the relation of the following Formula 3 is satisfied:

$T_2(t_p)=T_2(25)\times 2\hat{}((25-t_p)/K_A)$ ... (3)

21. The driving method according to Claim 16, wherein when the predetermined temperature is 25°C, and K_B is a constant relying on 5 to 50 liquid crystal materials, the magnification $n(t_p)$ relating to T_{10}, T_{11}, T_{12} and T_2 at an optional temperature t_p satisfies the relation of the following Formula 4 (ˆ indicates an index):

$n(t_p)=n(25)\times 2\hat{}((25-t_p)/K_B)$ ... (4)

22. In a driving method for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving method being characterized by comprising a first stage of applying a voltage so that the alignment of the cholesteric liquid crystal is in substantially parallel to a voltage application direction and a second stage of applying a voltage to change the state of the cholesteric liquid crystal to a homogenous state or a planar state.

23. The driving method according to Claim 22, wherein the voltage value applied in the second stage is 0 V.

24. The driving method according to Claim 23, wherein the period of the second stage is 0.3 - 100 ms.

25. In a driving apparatus for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving apparatus being characterized by comprising a first period determining circuit for determining a period of a first stage; a second period determining circuit for determining a second period in succession to the first stage, and a voltage application circuit wherein a voltage is applied to the cholesteric liquid crystal so that its alignment is in substantially parallel to a voltage application direction in the first period produced by the first period determining circuit, and a voltage is applied to the cholesteric liquid crystal to change the state of the

liquid crystal to a homogeneous state or a planar state in the second period produced by the second period determining circuit.

26. The driving apparatus according to Claim 25, wherein the liquid crystal display device is provided with row electrodes and column electrodes; a passive addressing type driving is conducted; the voltage application circuit comprises a row driver for driving the row electrodes and a column driver for driving the column electrodes; and a controlling circuit is provided wherein the controlling circuit instructs to the row driver to apply a voltage of a non-display state to all the row electrodes and instructs to the column driver to apply a voltage of an ON display to all the column electrodes in the first period.

27. In a driving method for driving a liquid crystal display device with a cholesteric liquid crystal having a memory mode of operation, the driving method being characterized in that when a time spent until the cholesteric liquid crystal in a homeotropic state by the application of a voltage indicates the lowest dielectric constant after the application of the voltage is stopped, is represented by τ_H, a voltage is applied to the cholesteric liquid crystal so that the alignment of the liquid crystal is in substantially parallel to a voltage application direction; the state of the cholesteric liquid crystal is changed by applying a voltage pulse of

lower than τ_H, and a voltage pulse is applied to effect a display.